Radiation from accelerated particles in shocks and reconnections

K.-I. Nishikawa, E. J. Choi, K. W. Min, J. Niemiec, B. Zhang, P. Hardee, Y. Mizuno, M. Medvedev, A. Nordlund, J. T. Frederiksen, H. Sol, M. Pohl, D. H. Hartmann, & G. J. Fishman

We have investigated particle acceleration and shock structure associated with an unmagnetized relativistic jets propagating into an unmagnetized plasmas. Strong magnetic fields generated in the trailing shock contribute to the electrons transverse deflection and acceleration. We have calculated, self-consistently, the radiation from electrons accelerated in the turbulent magnetic fields. We found that the synthetic spectra depend on the Lorentz factor of the jet, its thermal temperature and strength of the generated magnetic fields. The properties of the radiation may be important for understanding the complex time evolution and/or spectral structure in gamma-ray bursts, relativistic jets in general, and supernova remnants.